Annuaire du mouvement coopératif international, 2ᵉ année, 1912. Publié au nom du comité central de l'alliance coopérative internationale. (Paris: Alcan. 1914. Pp. vi, 299. 5 fr.)

Statistics and Its Methods

Exercises in Statistical Method. By WILLFORD ISBELL KING. (Madison: The University Co-operative Association. 1913. Pp. 49. $.40.)

Lectures cannot give to the ordinary student a working knowledge of the principles and methods of statistics; practice in handling data is necessary. In the natural sciences the laboratory method has long been recognized as essential. In these subjects the student is not regarded as a trained scientist until he has traced out the nervous system, or analyzed compounds, or experimented with the force of gravitation. The would-be statistician must learn the limitations of his original material at the sources, and how reliable data may be secured; he must learn to think in quantitative terms; he must be trained to use with caution and accuracy the data when gathered, and to present the results in clear and simple fashion.

Professor Walter F. Willcox, at the International Congress of Hygiene and Demography held at Washington in 1912, expressed his belief that the best opportunity for the training of statisticians lies not with the universities alone or with special schools of sanitary science, but with official statistical offices which constitute the best laboratory for practice work. He, therefore, advocated closer coöperation between academic instruction in statistics and official offices. In this manner the late Carroll D. Wright developed a group of American labor statisticians; William Farr trained men in England; and Ernst Engel in Russia.

However, with the present leadership in official positions this coöperation has not been widely established. For the present, therefore, it is desirable to provide laboratory training in connection with lecture courses in statistics in our colleges and universities. Nothing will accomplish so much toward removing the current notion that statistics are dry and uninteresting facts used in haphazard manner to prove or disprove any sort of proposition. In the laboratory may be assembled the results of all sorts of investigations, with the original schedules from which tabulations have been made and conclusions drawn. Here the student may learn the importance of a wide preliminary study of the problem to be

investigated, the fundamental principles of planning an inquiry, and the methods of analyzing and relating the facts. Here may be gathered the important sources of information for research and criticism. The statistical laboratory is not a place for mere mechanical processes. These may be performed by machines, for the most part. It is a place for the exercise of the highest intellectual processes and for the development of the best critical judgment and common sense. The speculations of reason are being checked and modified in the light of existing facts.

Dr. King, instructor in statistics at the University of Wisconsin, author of the text, *Elements of Statistical Method,* has recently published this pamphlet containing 24 exercises suitable for laboratory training, designed for the use of teachers of statistics, in conjunction with his text. Convenient section references to the text are found with each laboratory exercise which is designed to give practice as to that particular principle or method. The author assures us that a majority of the exercises have been used by him in class work for several years, thus giving opportunity to eliminate defects and to test their adequacy for the purpose for which they have been planned. Every teacher of elementary statistics knows how important it is to select appropriate problems for the purpose of aiding the students' understanding and at the same time with the aim to avoid confusion. This exercise book will prove suggestive. It does not follow that the instructor will use each problem in the manual or even a majority of them, because he must work out his own material, to a large extent, if he successfully meets the needs and interests of his students. Besides, his own interests will dictate, largely, the sources from which his material may profitably be drawn for practice work. In this manner both instructor and students feel that they are making statistics an instrument in their work. Such a complete set of exercises, for the overburdened teacher, will prove a convenient refuge. For every instructor, the manual will indicate the method of procedure in a logical and effective presentation of necessary methods and principles in concrete form.

The exercises begin with the collection of data and the tabulation of the results. Methods of analysis and reduction of the raw material involve practice in the use of the various averages; construction of frequency graphs and the calculation of measures of dispersion about the average; construction of price indices and graphic devices; methods of showing long- and short-time changes;

and illustration of the meaning of correlation, together with the measurement of the degree of relationship.

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Statistical Averages. A Methodological Study. Authorized translation from the German of FRANZ ZIZEK by WARREN M. PERSONS. (New York: Henry Holt and Company. 1913. Pp. ix, 392. $2.50.)

Dr. Zizek's *Die statistischen Mittelwerte,* published in 1908, is a study of abstract statistical method as applied to "the great central problem of averages." It is not a book which embodies experience of practical statistics. It does not, save for illustrative purposes, deal with the concrete subject-matter of any branch of statistical investigation. In substance it is a critical compilation from the many-sided literature of theoretical statistics, in which the author assiduously versed himself. It links the fundamental concepts of "mathematical statistics" with more familiar principles, though it avoids mathematical language. Dr. Zizek pretends to no authority as a mathematician; but he properly "deems some consideration of mathematical statistics indispensable because its problems do not differ essentially from those of elementary scientific statistics."

The treatment of the subject falls into three parts. Part I, on Statistical Averages in General, offers a preliminary classification of statistical series; discusses the criteria of data from which valid averages may be derived; and outlines the nature and purposes of averages. Part II is devoted to The Various Kinds of Averages—the arithmetic mean, the geometric mean, the median and the mode—but includes, under the rubric "The Arithmetic Mean and Mathematical Statistics," a section on statistical applications of the laws of error and of probability. Part III treats of Dispersion about the Mean or Average, and thus eventually leads the reader again into the domain of the mathematical statistician. A group of appendices deals with special topics and includes a useful bibliography.

Professor Persons offers his translation as a college text. The German original had seemed to him "to meet the requirements of a non-mathematical textbook on statistics better than any work available in English. . . ." The reader, therefore, is led to judge the book according to its fitness for such use, realizing how warm a